Shaw High School

Honors Biology Research Project

**Why pursue scientific research?**

Much is to be gained by conducting science research:

* It increases ones understanding of science concepts and processes.
* It nurtures the ability to solve problems.
* It enables you to become a more effective communicator.
* It helps you to better use resources, especially technological resources.
* It provides opportunities to fully develop leadership skills and academic rewards.
* It encourages a career in the field of science.
* It demonstrates the interdependence and importance of community.

**The attributes of the most successful student researchers in science.**

* Can find joy in the process of scientific research.
* Use the scientific method with expertise.
* Know how to be self reliant.
* Are self motivated and hard workers.
* Have serious intent of taking research skills to a higher level.
* Use academic resources effectively.
* Finish each phase in a timely manner.

**Choosing a topic**

While choosing a topic is quite an exciting time, it can quickly develop into a frustrating phase as well. It is not the job of your teacher to suggest a topic. If ask yourself the following questions, you should be able to begin selecting:

* What area of science interest me the most?
* Which local resources are available to use for my science research?
* What are some science research ideas?level
* Do I want to build on a previous project?
* Is this a project I would enjoy, and can do in a timely manner?
* “Well begun is half done.” What are the rules about science project entries?
* Have I checked with those involved concerning safety aspects?

**The top 10 things to ask yourself once your research has begun:**

* Is this a high-school level science research project?
* How did I measure my outcome?
* Are all my measurements in metric?
* Is there an abundance of pictures, especially within the procedure to better clarify my research?
* During each step did I journal in my research book and take pictures?
* Did I follow the order in the scoring guide for the research paper and fully respond to each category?
* Am I giving this effort as much time as I need to justify the point value this will receive?
* Have I sought assistance to help me upgrade my efforts along the way?
* Do I know the difference between my manipulated and responding variables?
* Am I moving along in a timely manner?

**Research Project Requirements**

This is a formal paper, it must be typed, double spaced, on white unlined 8 ½ x 11 paper. The top and bottom margins will be 1” and the left and right margins will be 1”. Each page must be numbered.

You will submit individual items on the given dates(see chart). Remember that meeting all deadlines is part of your grade. The final paper needs to include all of the following items in the correct order and appropriately done.

1. **Title Page** – This must include the title of your paper, your name and the date submitted. This should be on a separate sheet of paper.
2. **Table of Contents** – Pages should be numbered and this should reflect what each page or range of pages included in the report. This should be on a separate sheet of paper.
3. **Abstract** – A concise statement, 100 words or less, summarizing the overall paper. Complete after you have written your paper.
4. **Problem/Question** – Please write in the form of a question.
5. **Purpose** – One to three sentences that explain why the experiment is being done.
6. **Hypothesis** – This statement must be in “if …. then” format and the null hypothesis format . Be sure the independent variable if the “if” and the “then” statement includes both the dependent and variable and the prediction.
7. **Variables** – List the independent variable, the dependent variable, and the consant.
8. **Groups** – Identify the control group and the experimental group.
9. **Materials** – List all materials that will be used in the investigation. Include how much, and what kinds of items are needed. Keep in mind quantities are important. Be sure to use only METRICS.
10. **Procedure** – List step-by-step directions in performing the experiment. It should be SO DETAILED that anyone could do it as you have! Be sure to have several samples within each experimental group and repeat the experiment at least 5 times.
11. **Pictures** – Take pictures often of your experimental process. Pictures are the best source of evidence you completed the research project.
12. **Results**  --
    1. **Data table** – Be sure it is typed and has the appropriate items included. There should be at least 10 entries.
    2. **Graphs(s)** – Be sure you have the appropriate graph(s) to display your data and be sure it/they have a title, labels and even increments. These should be done on the computer and not hand written.
13. **Interpretation of Results** – Tell what the graph was about, what was measured, how it was measure, why the results were obtained, and what the data chart is showing. Essentially, this is a written summary of your results. Please do not write in the first person.
14. **Conclusion** – In paragraph form include hypothesis(was it accepted or rejected), and a brief interpretation. Your conclusion is drawn from your interpretations of the data and the support or rejection of your hypotheisis.

\*\*Students are prohibited from using vertebrate animals in the experiments or testing of such animals without following the guidelines of the international rules for use of vertebrate subjects. Please see your instructor for the form. The form must be completed prior to you turning in your purpose.

**Honors Biology Research Project Time Line**

\*\*All steps must be handed in on or before the due date, and must be typed.

